

REMARKS

The Office Action dated December 17, 2009, has been received and carefully reviewed. The preceding amendments and the following remarks form a full and complete response thereto.

Status of Claims

Claims 8 is hereby cancelled without prejudice or disclaimer.

Claims 7 and 12 are hereby amended. Support for the amendments to claim 7 may be found in Applicants' specification¹ at, inter alia, in the Abstract and at paragraphs [0013], [0015], [0042]-[0043], and [0064]. Support for the amendments to claim 12 may be found in Applicants' specification at, inter alia, paragraphs [0013], [0015], [0020], [0023], [0043], [0061]-[0062], and [0065].

Claims 13-17 are hereby added to this application. Support for the subject matter recited in claims 13, 14, and 16 may be found in Applicants' specification at, inter alia, paragraphs [0020], [0023], [0061]-[0062] and [0065]. Support for the subject matter recited in claims 15 and 17 may be found in in Applicants' specification at, inter alia, paragraphs [0013] and [0043].

No new matter is added by this amendment.

Rejections under 35 U.S.C. § 103

¹ Citations to the Applicants' specification follow the paragraph numbering as set forth in the pre-grant publication corresponding to this application, i.e., U.S. Pub. No. 2006/0226374 to Rigler et al.

Claims 7-9, 11, and 12 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Pub. No. 2001/0033374 to Hoyt ("Hoyt"), U.S. Pub. No. 2005/0012033 to Stern et al. ("Stern"), and U.S. Pat. No 6,071,748 to Modlin ("Modlin"). Applicants traverse this rejection and respectfully submit that the Office Action fails to establish a prima facie case of obviousness with regard to claims 7-9, 11, and 12.

Independent Claim 7

Claim 7 recites device for determining luminescent molecules including, among other features: an optical detection device including a matrix of avalanche photodiodes, and signal processing and evaluation means for processing signals provided by the avalanche photodiode matrix. In the embodiment of claim 7, the optical detection device and the signal processing and evaluation means are both integrated in a sensor chip. The Office Action argues that the feature of claim 7 related to the signal processing and evaluation means being integrated in the sensor chip is disclosed by Stern at paragraph [0083]. Applicants respectfully disagree.

Paragraph [0083] of Stern discloses an embodiment with two "accumulator arrays" for holding pixel data. Each accumulator counts the number of photons that have been detected by its corresponding avalanche photodiode during a respective detection cycle. Accumulators as disclosed by Stern are typical components for Geiger-mode operation or signal-photon-count operation of an avalanche photodiode array. As would be readily understood by those having ordinary skill in the art, the accumulators and the further components of the Stern-chip are signal-processing components for

providing image raw data, but not evaluated measurement results. That is, while the cited portion of Stern may disclose some limited form of "processing" that is integrated with the chip, the Office Action fails to cite any disclosure of evaluation means integrated in the sensor chip as recited in claim 7. For at least this reason, the Office Action fails to establish a prima facie case of obviousness with respect to claim 7 and Applicants respectfully request that the outstanding rejection of claim 7 under 35 U.S.C. § 103 be withdrawn.

Furthermore, claims 9 and 10 are dependent on claim 7 and incorporate all of the features recited therein. Accordingly, the Office Action also fails to establish a prima facie case of obviousness with regard to these claims for at least similar reasons as those discussed with regard to claim 7, and Applicants respectfully request that the outstanding rejection of claims 9-10 under 35 U.S.C. § 103 be withdrawn.

Independent Claims 11 and 12

Claims 11 and 12 recite devices for determining luminescent molecules including, among other features: an optical detection device including a matrix of avalanche photodiodes, and signal processing and evaluation means for processing signals provided by the avalanche photodiode matrix. In the embodiments of claims 11 and 12, the optical detection device and the signal processing and evaluation means are both integrated in a sensor chip. Furthermore, the signal processing and evaluation means include one or more correlators for carrying out signal correlation operations (e.g.

autocorrelation functions or/and cross-correlation functions) on the signals provided by the avalanche photodiode matrix.

The Office Action argued that the feature of claims 11 and 12 related to the signal processing and evaluation means being integrated in the sensor chip is disclosed by Stern at paragraph [0083]. Applicants respectfully disagree. As discussed above with regard to claim 7, the cited portions of Stern fail to disclose an evaluation means integrated in the sensor chip.

The Office Action argued that the feature of claims 11 and 12 related to the signal processing and evaluation means including at least one correlator is disclosed by Stern at paragraph [0040]. Applicants respectfully disagree.

Paragraph [0040] of Stern merely discloses that the digitized raw data from the device disclosed therein may be read out without noise (in contrast to, e.g., analog signals) and therefore cross-correlation operations may be performed of successive data of frames to reduce motion jitter. The cited passage does not disclose or even suggest where these cross-correlations may be calculated. Paragraph [0040] completely fails to disclose that the cross-correlation calculations are performed by an integrated correlator as an evaluation circuit. As discussed above, at best the cited passages of Stern arguably disclose a limited form of "processing" that is integrated with the chip, but one having ordinary skill in the art would not understand these limited processing features as the recited evaluation means or the recited correlators. For at least this reason, the Office Action fails to establish a prima facie case of obviousness

with respect to claims 11 and 12 and Applicants respectfully request that the outstanding rejection of claims 11 and 12 under 35 U.S.C. § 103 be withdrawn.

Claim 10 was rejected under 35 U.S.C. §103(a) as being unpatentable over Hoyt, Stern, and Modlin, and in further view of U.S. Pat. No.6,078,681 to Silver ("Silver"). Applicants traverse this rejection and respectfully submit that the Office Action fails to establish a prima facie case of obviousness with regard to claim 10.

Claim 10 depends from claim 7 and incorporates all of the features recited therein. For example, claim 10 incorporates the feature of claim 7 related to the signal processing and evaluation means being integrated in the sensor chip. As discussed above, the Office Action fails to establish a prima facie case of obviousness with regard to claim 7 at least because the Office Action fails to identify this feature in the cited references. Accordingly, the Office Action also fails to establish a prima facie case of obviousness against claim 10 at least with regard to this feature for similar reasons as those discussed with regard to claim 7. Thus, Applicants respectfully request that the outstanding rejection of claim 10 under 35 U.S.C. § 103 be withdrawn

In view of the foregoing, all rejections have been sufficiently addressed. The Applicants submit that the application is now in condition for allowance and request that claims 7 and 9-17 be allowed and this application passed to issue.

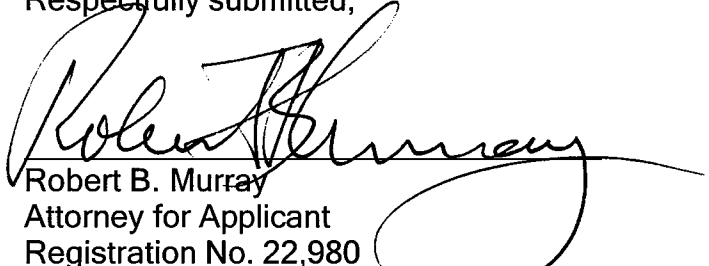
Commissioner is hereby authorized to charge any additional fees and/or credit

any overpayments required under 37 C.F.R. §§ 1.16 and 1.17 to Counsel's Deposit Account No. 02-2135.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the Applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

Respectfully submitted,

By


Robert B. Murray
Attorney for Applicant
Registration No. 22,980
ROTHWELL, FIGG, ERNST & MANBECK
1425 K. Street, Suite 800
Washington, D.C. 20005
Telephone: (202) 783-6040

RBM/fjb